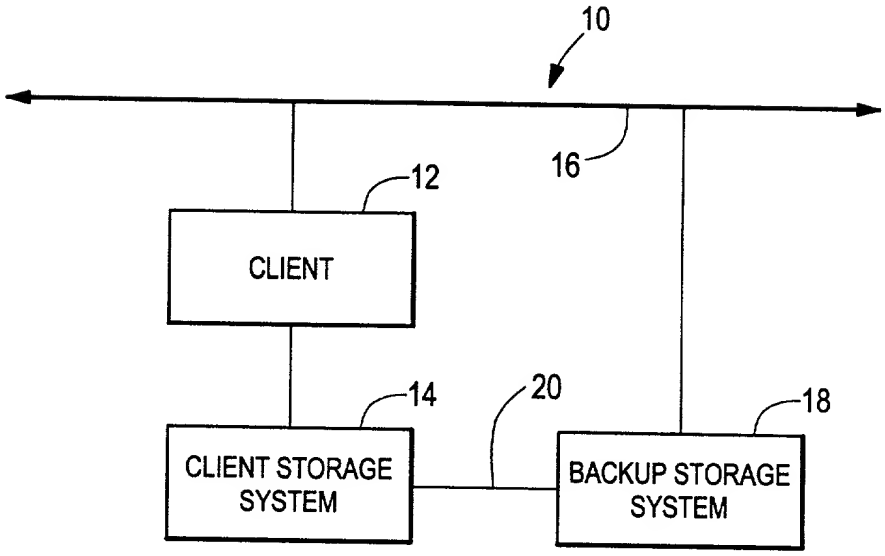
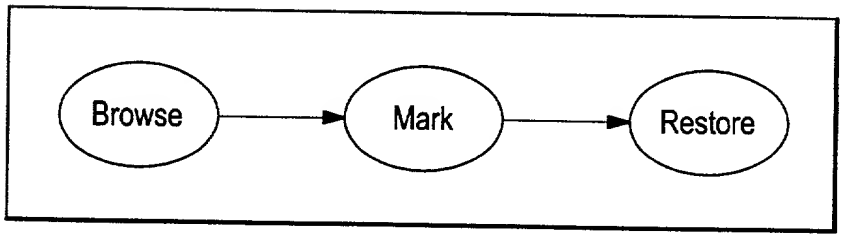


PRIOR ART

FIG. 1



PRIOR ART

FIG. 2

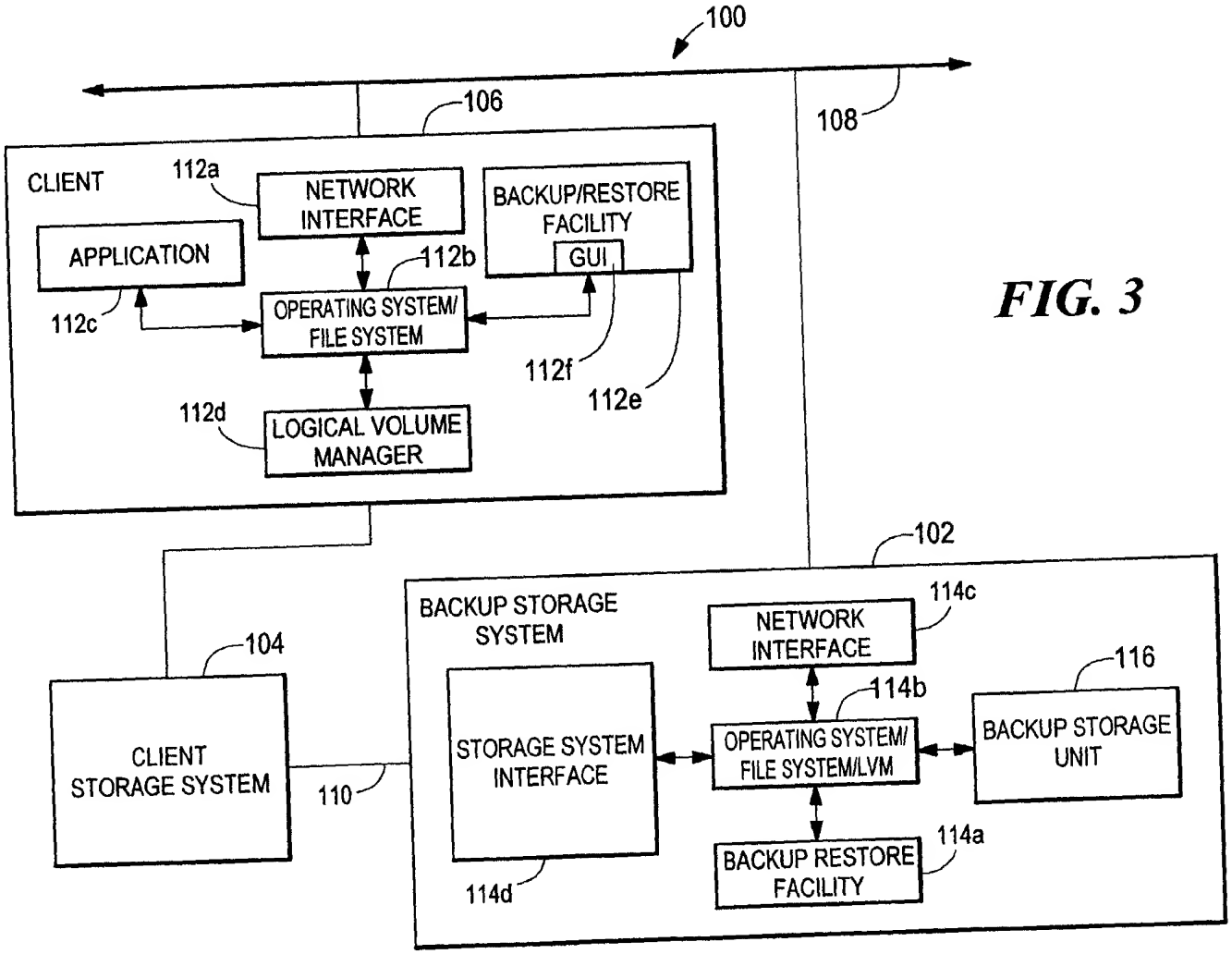

100
106
108
CLIENT
112a
NETWORK INTERFACE
BACKUP/RESTORE FACILITY
GUI
APPLICATION
112b
112c
OPERATING SYSTEM/ FILE SYSTEM
112f
112e
112d
LOGICAL VOLUME MANAGER
102
BACKUP STORAGE SYSTEM
114c
NETWORK INTERFACE
104
116
114b
CLIENT STORAGE SYSTEM
STORAGE SYSTEM INTERFACE
OPERATING SYSTEM/ FILE SYSTEM/LVM
BACKUP STORAGE UNIT
110
114a
BACKUP RESTORE FACILITY
114d

FIG. 3

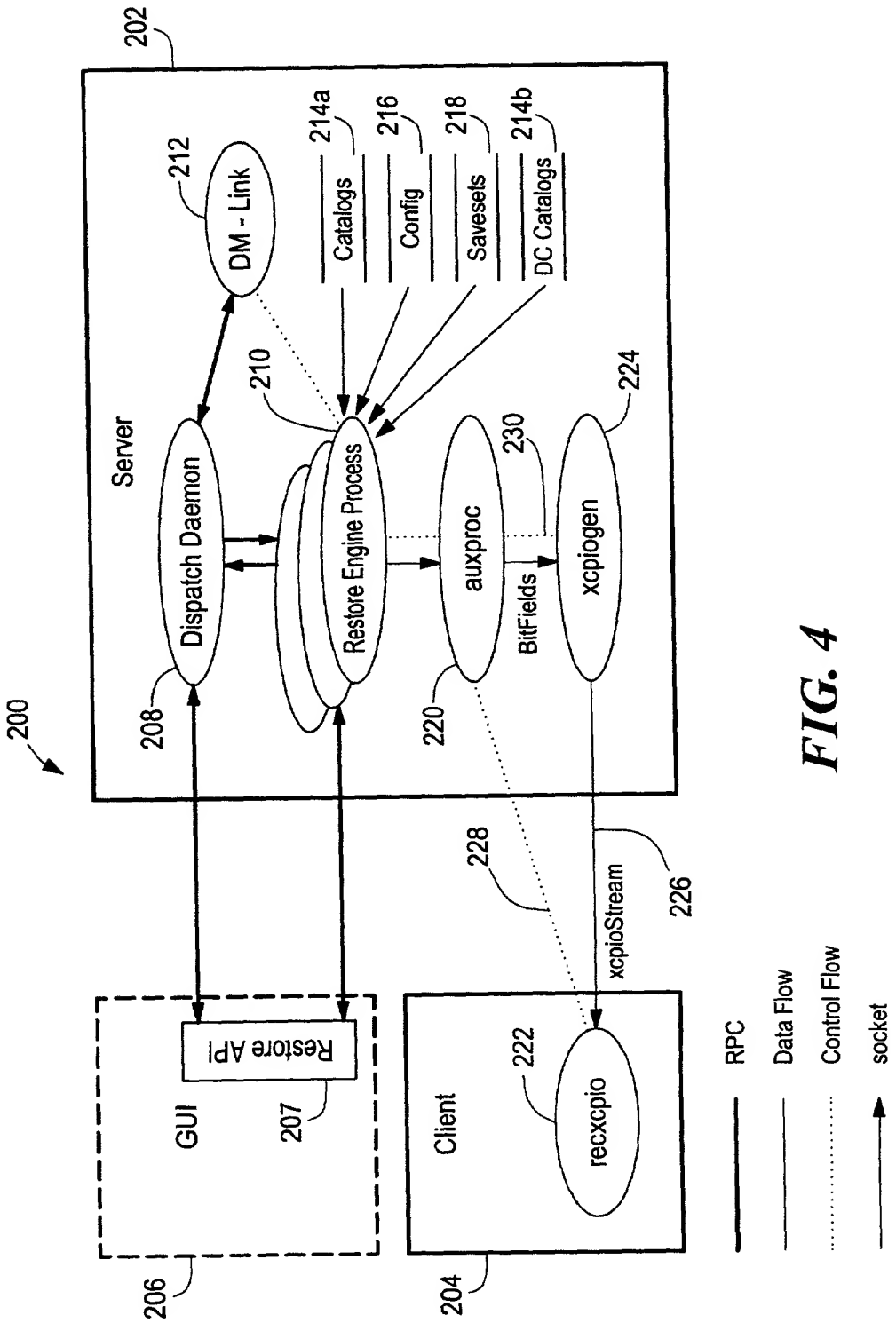

200
202
Server
208
Dispatch Daemon
210
Restore Engine Process
212
DM - Link
214a
Catalogs
216
Config
218
Savesets
214b
DC Catalogs
220
auxproc
230
BitFields
224
xcpiogen
206
GUI
Restore API
207
204
Client
222
recxcpio
228
226
xcpioStream
RPC
Data Flow
Control Flow
socket

FIG. 4

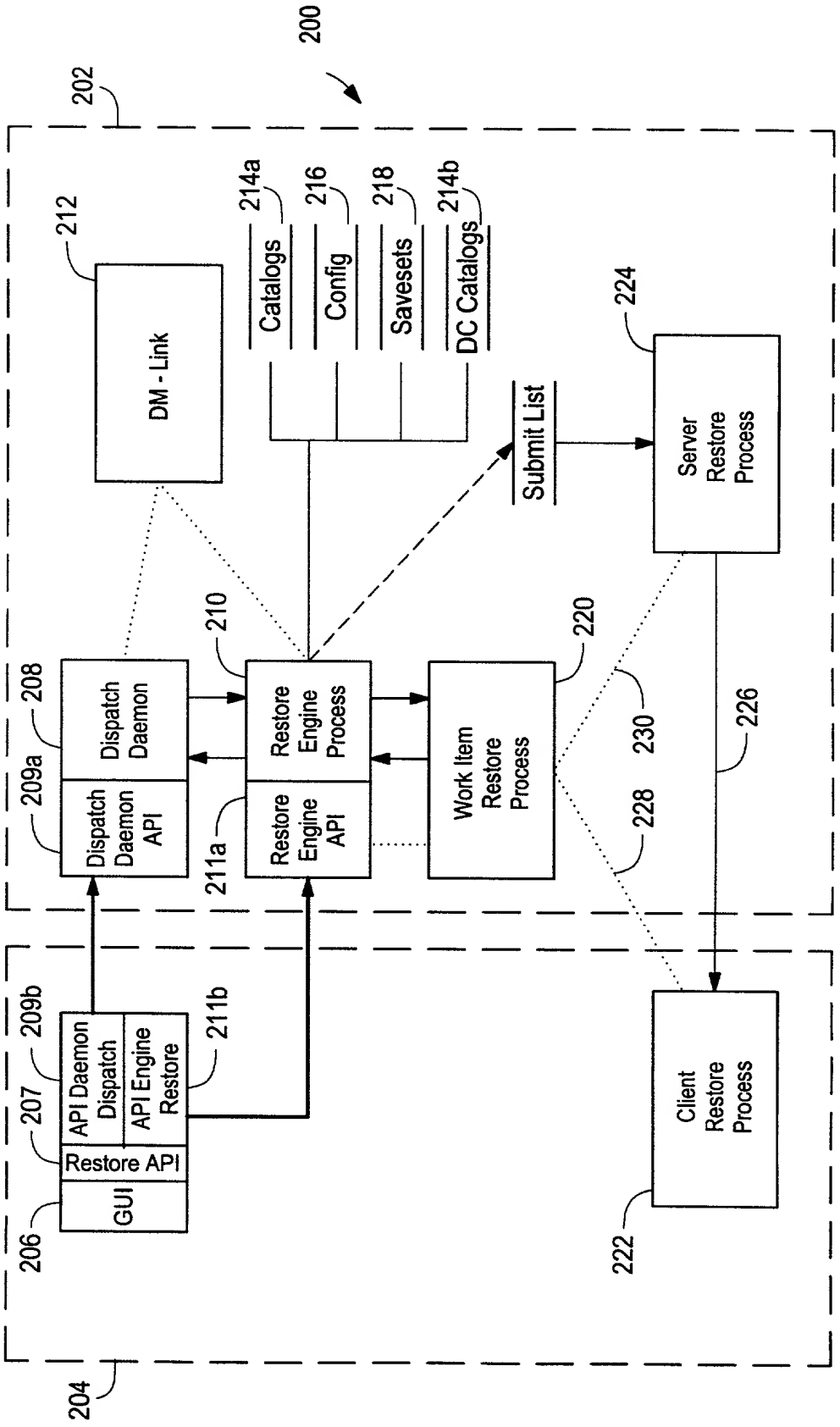

200
202
212
DM - Link
214a
Catalogs
216
Config
218
Savesets
214b
DC Catalogs
224
Server Restore Process
Submit List
208
209a
Dispatch Daemon
Dispatch Daemon API
210
Restore Engine Process
211a
Restore Engine API
220
Work Item Restore Process
230
228
226
209b
207
API Daemon Dispatch
API Engine Restore
211b
Restore API
206
GUI
222
Client Restore Process
204

FIG. 5

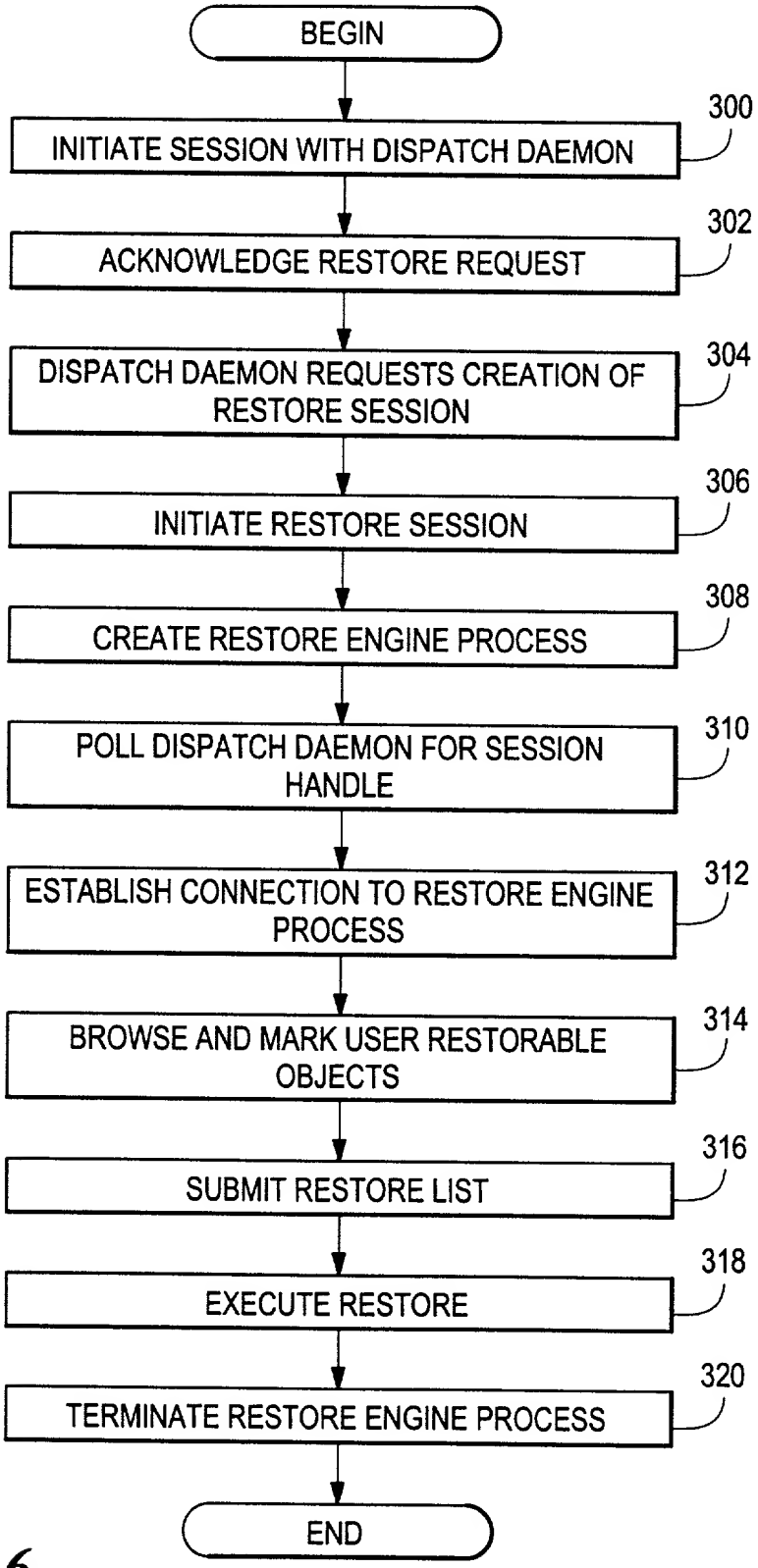

BEGIN
INITIATE SESSION WITH DISPATCH DAEMON
300
ACKNOWLEDGE RESTORE REQUEST
302
DISPATCH DAEMON REQUESTS CREATION OF RESTORE SESSION
304
INITIATE RESTORE SESSION
306
CREATE RESTORE ENGINE PROCESS
308
POLL DISPATCH DAEMON FOR SESSION HANDLE
310
ESTABLISH CONNECTION TO RESTORE ENGINE PROCESS
312
BROWSE AND MARK USER RESTORABLE OBJECTS
314
SUBMIT RESTORE LIST
316
EXECUTE RESTORE
318
TERMINATE RESTORE ENGINE PROCESS
320
END

FIG. 6

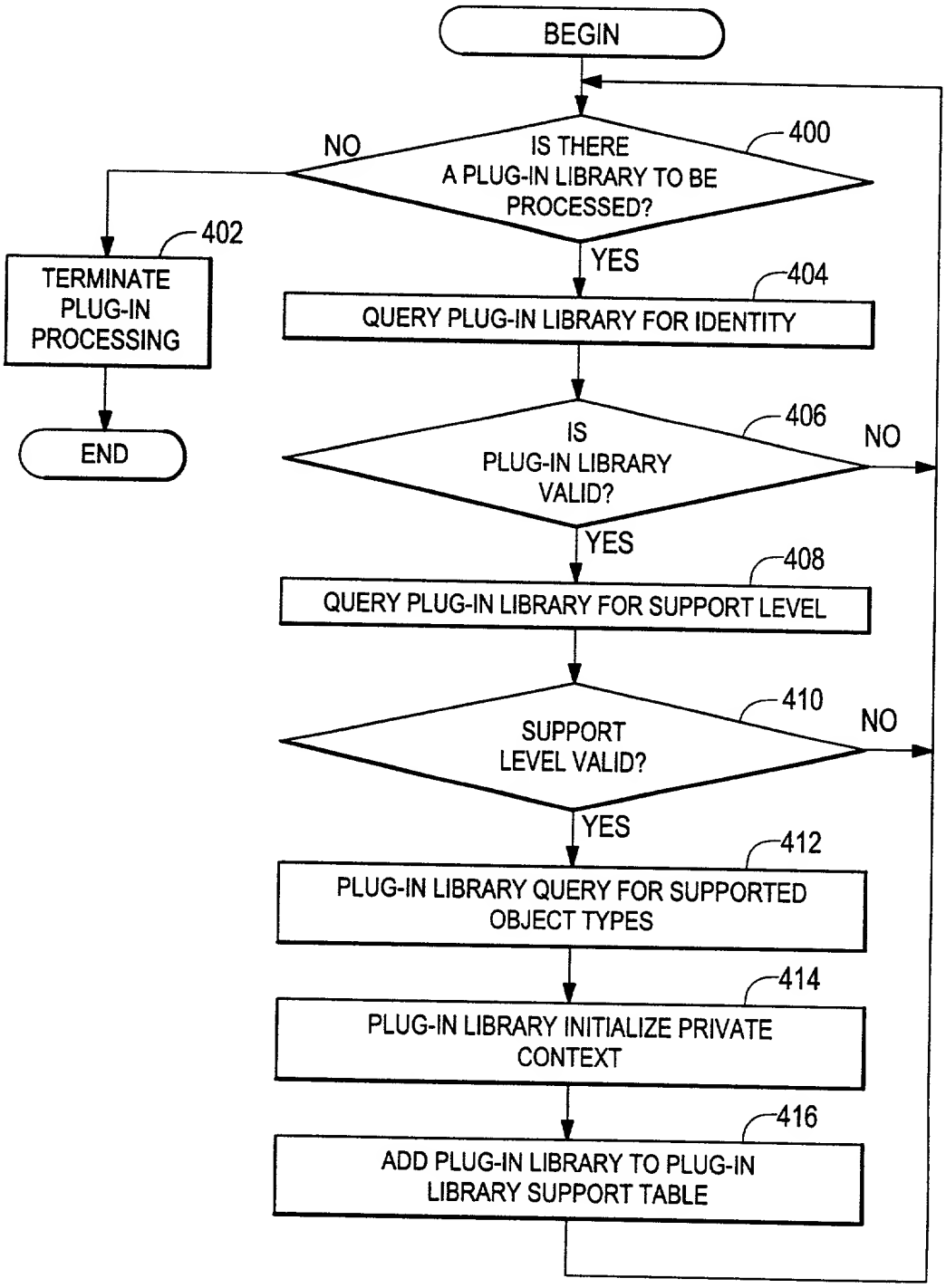

BEGIN
IS THERE A PLUG-IN LIBRARY TO BE PROCESSED?
400
NO
YES
TERMINATE PLUG-IN PROCESSING
402
END
QUERY PLUG-IN LIBRARY FOR IDENTITY
404
IS PLUG-IN LIBRARY VALID?
406
NO
YES
QUERY PLUG-IN LIBRARY FOR SUPPORT LEVEL
408
SUPPORT LEVEL VALID?
410
NO
YES
PLUG-IN LIBRARY QUERY FOR SUPPORTED OBJECT TYPES
412
PLUG-IN LIBRARY INITIALIZE PRIVATE CONTEXT
414
ADD PLUG-IN LIBRARY TO PLUG-IN LIBRARY SUPPORT TABLE
416

FIG. 7

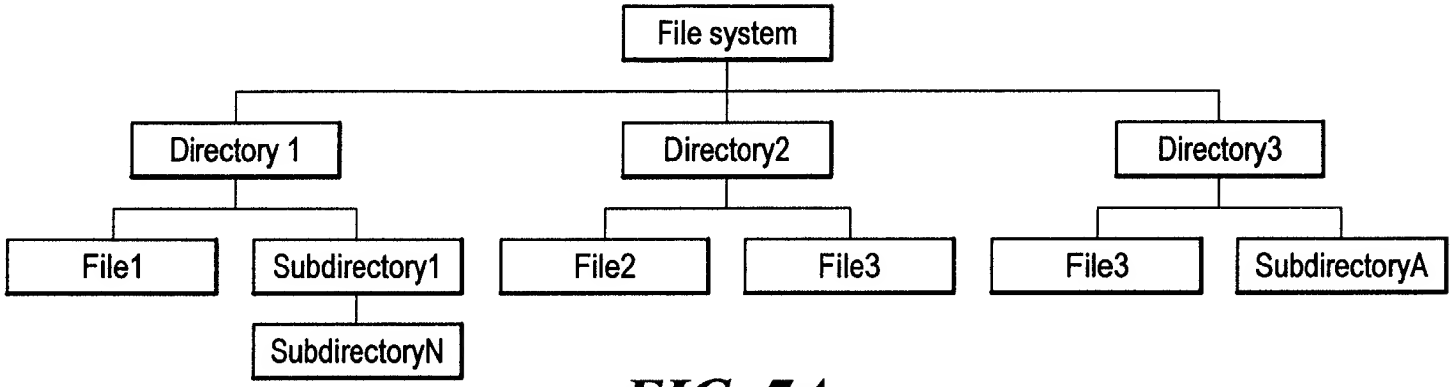

File system
Directory 1
Directory2
Directory3
File1
Subdirectory1
SubdirectoryN
File2
File3
File3
SubdirectoryA

FIG. 7A

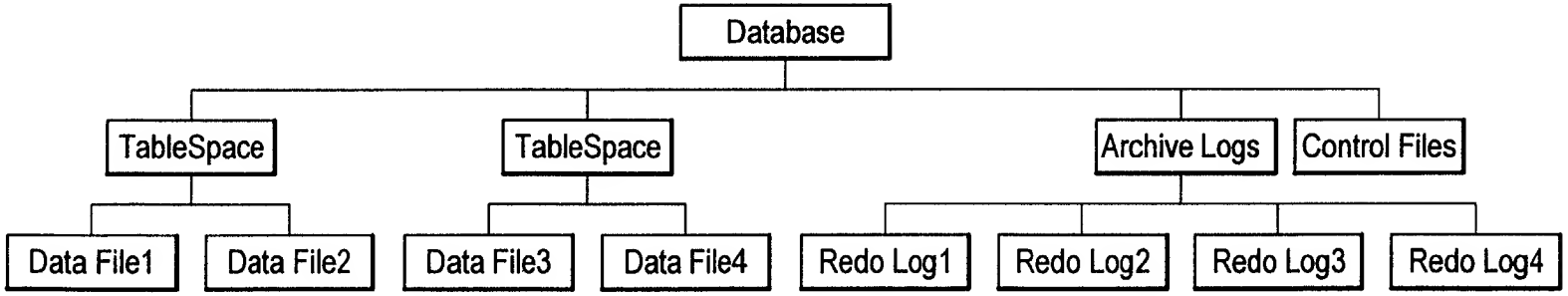

Database
TableSpace
TableSpace
Archive Logs
Control Files
Data File1
Data File2
Data File3
Data File4
Redo Log1
Redo Log2
Redo Log3
Redo Log4

FIG. 7B

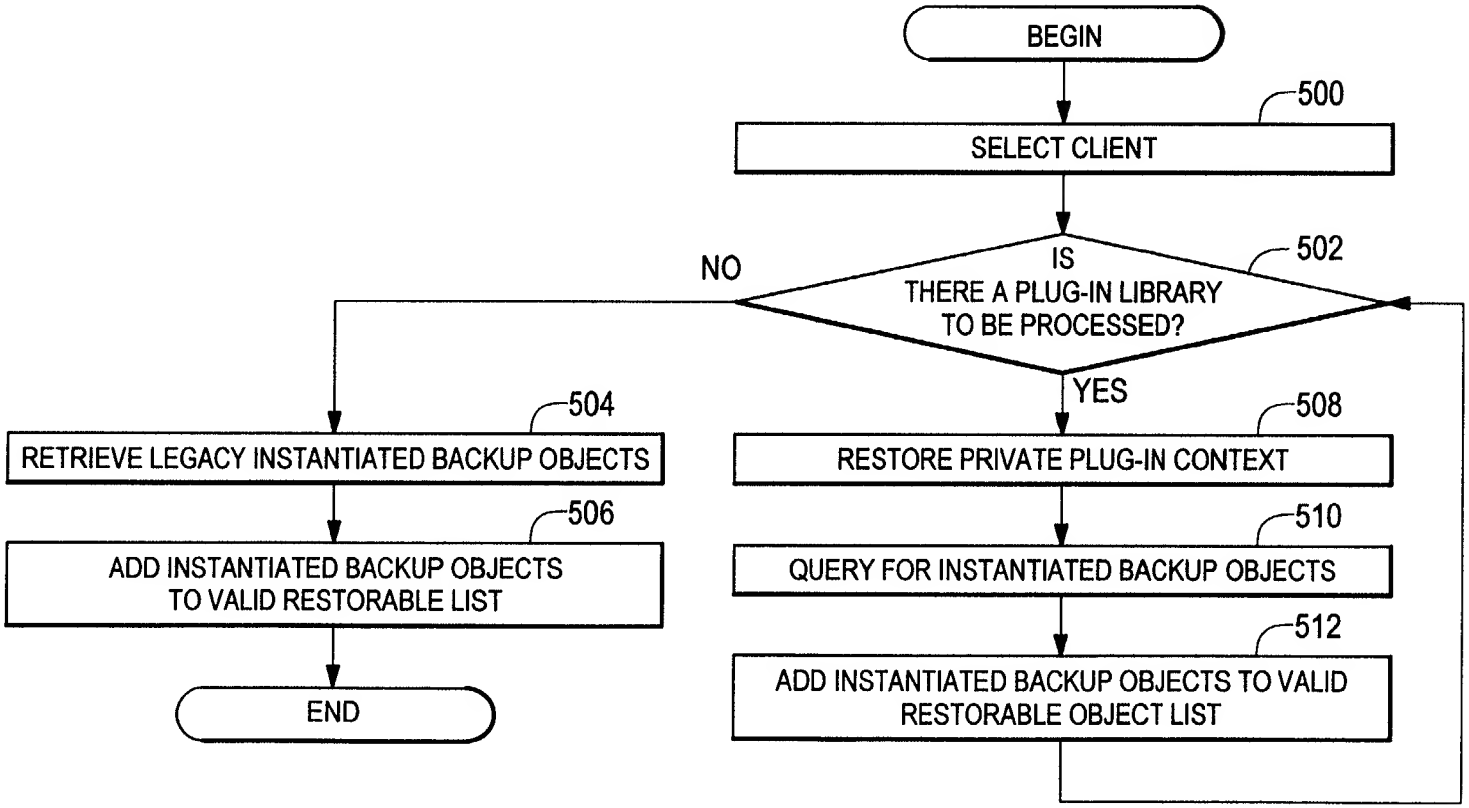

BEGIN
500
SELECT CLIENT
502
IS THERE A PLUG-IN LIBRARY TO BE PROCESSED?
NO
YES
504
RETRIEVE LEGACY INSTANTIATED BACKUP OBJECTS
506
ADD INSTANTIATED BACKUP OBJECTS TO VALID RESTORABLE LIST
END
508
RESTORE PRIVATE PLUG-IN CONTEXT
510
QUERY FOR INSTANTIATED BACKUP OBJECTS
512
ADD INSTANTIATED BACKUP OBJECTS TO VALID RESTORABLE OBJECT LIST

FIG. 8

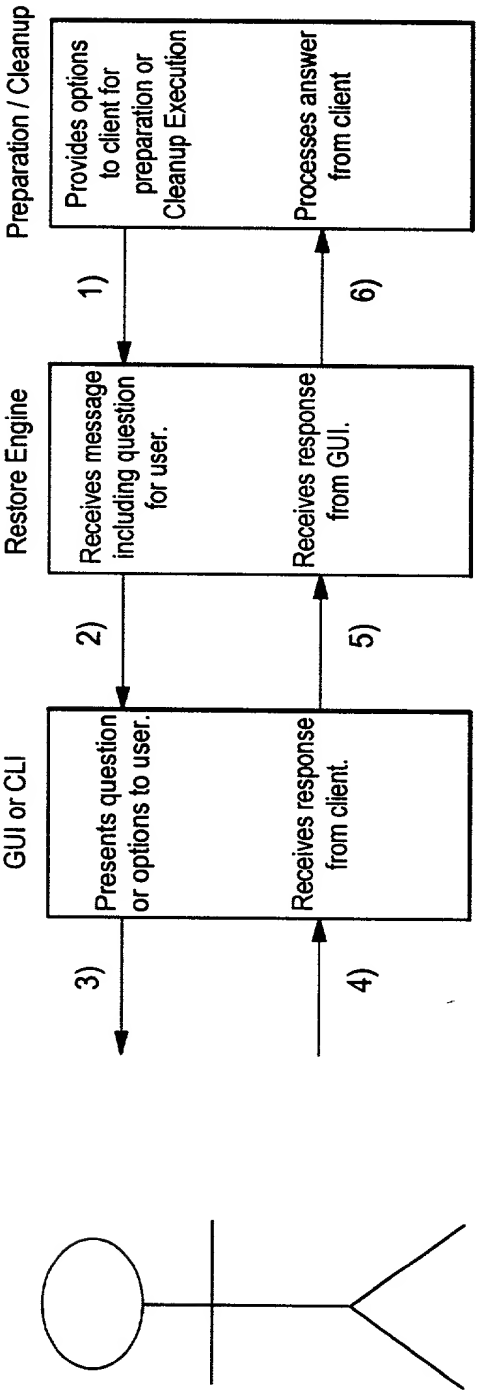

Preparation / Cleanup
Provides options to client for preparation or Cleanup Execution
Processes answer from client
1)
6)
Restore Engine
Receives message including question for user.
Receives response from GUI.
2)
5)
GUI or CLI
Presents question or options to user.
Receives response from client.
3)
4)

FIG. 8A

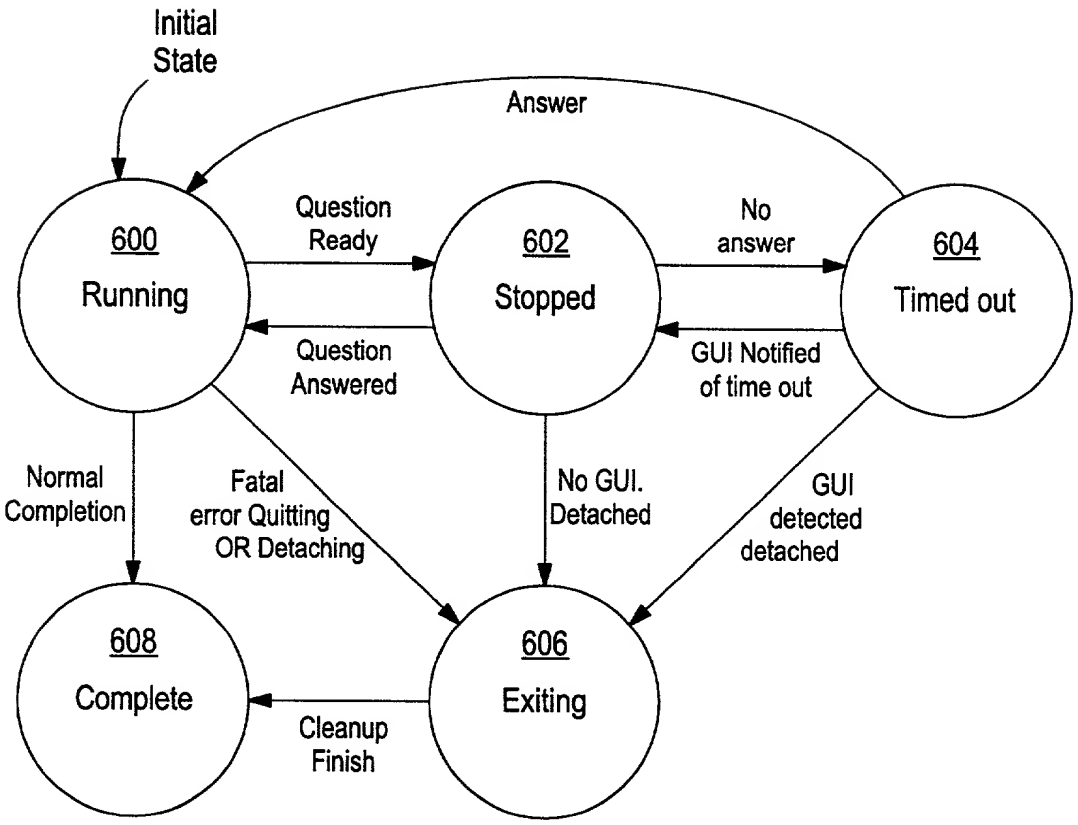

Initial State
Answer
600
Running
Question Ready
602
Stopped
No answer
604
Timed out
Question Answered
GUI Notified of time out
Normal Completion
Fatal error Quitting OR Detaching
No GUI. Detached
GUI detected detached
608
Complete
606
Exiting
Cleanup Finish

FIG. 9

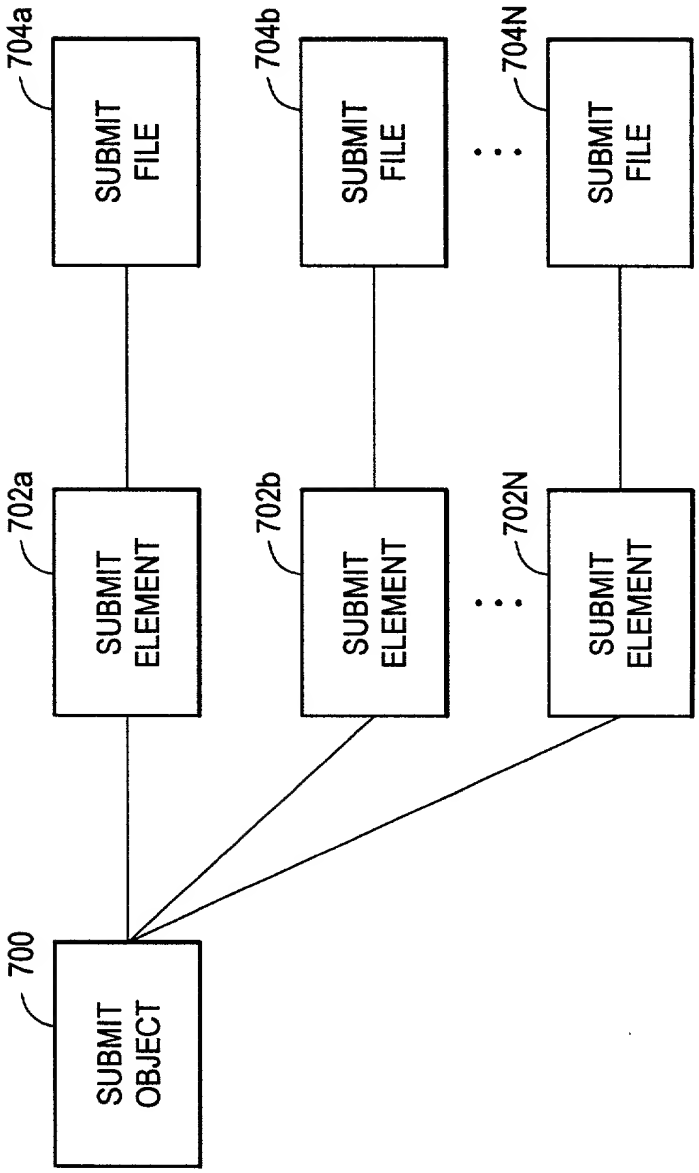

704a
SUBMIT FILE
704b
SUBMIT FILE
704N
SUBMIT FILE
702a
SUBMIT ELEMENT
702b
SUBMIT ELEMENT
702N
SUBMIT ELEMENT
700
SUBMIT OBJECT

FIG. 10

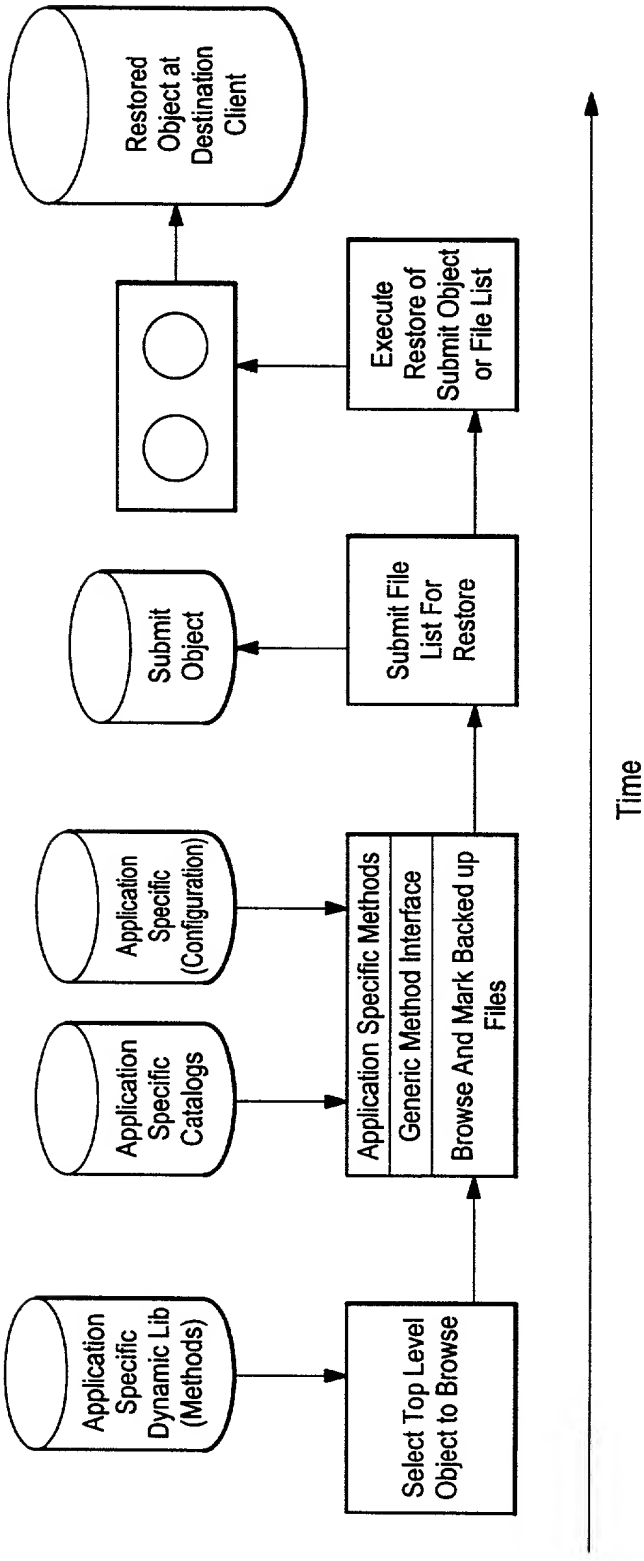

Application Specific Dynamic Lib (Methods)
Application Specific Catalogs
Application Specific (Configuration)
Submit Object
Restored Object at Destination Client
Select Top Level Object to Browse
Application Specific Methods
Generic Method Interface
Browse And Mark Backed up Files
Submit File List For Restore
Execute Restore of Submit Object or File List
Time

FIG. 10A

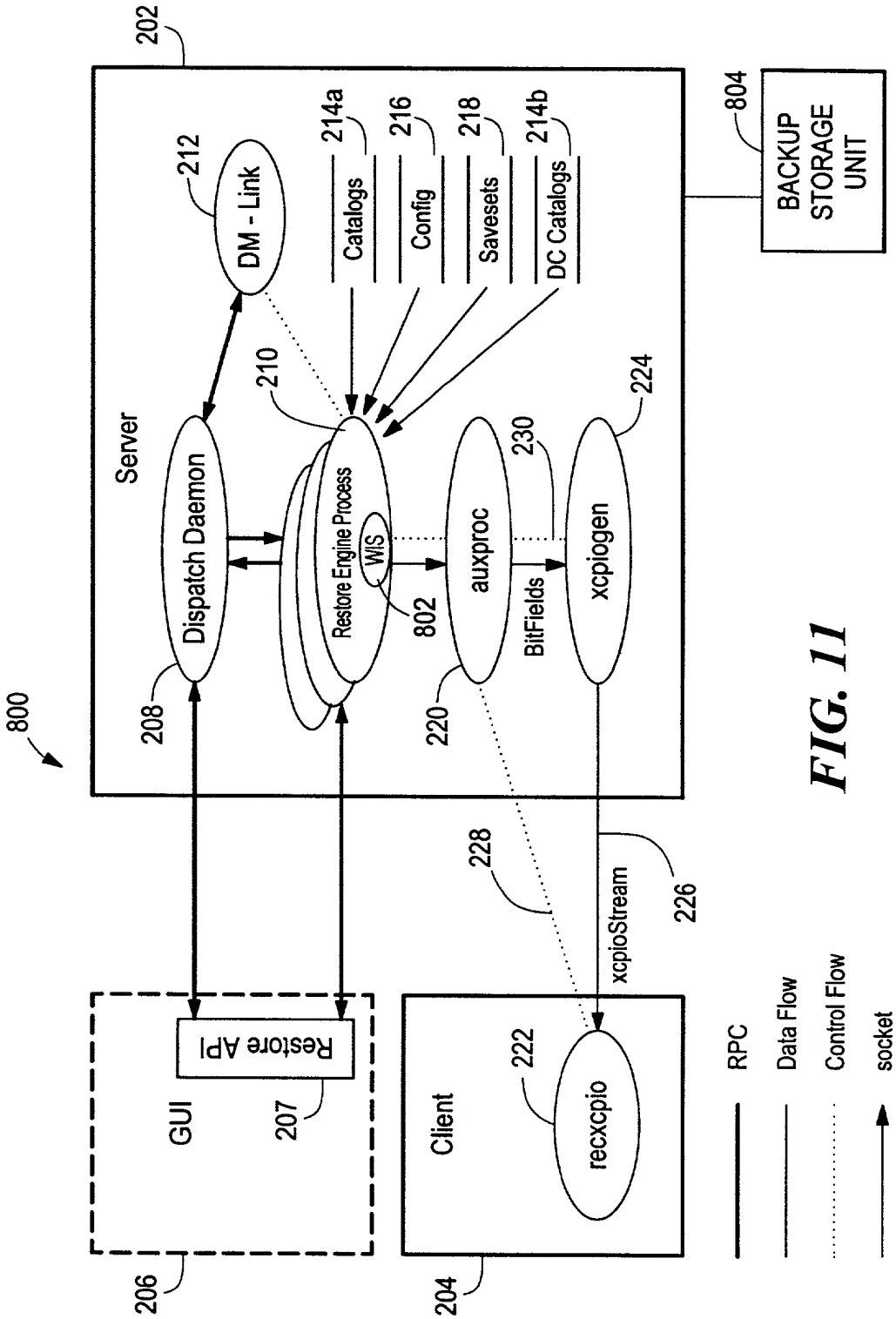

800
202
Server
208
Dispatch Daemon
212
DM - Link
210
214a
Catalogs
216
Config
218
Savesets
214b
DC Catalogs
Restore Engine Process
WIS
802
220
auxproc
230
BitFields
224
xcpiogen
804
BACKUP STORAGE UNIT
228
226
xcpioStream
206
GUI
Restore API
207
204
Client
222
recxcpio
RPC
Data Flow
Control Flow
socket

FIG. 11

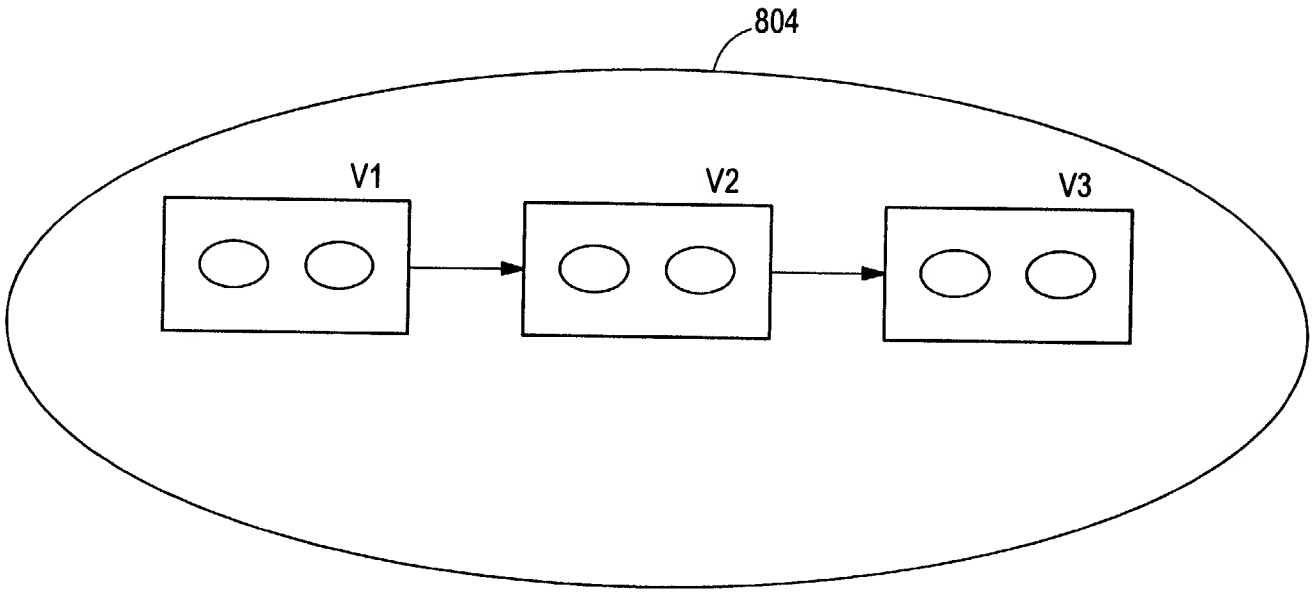


FIG. 12

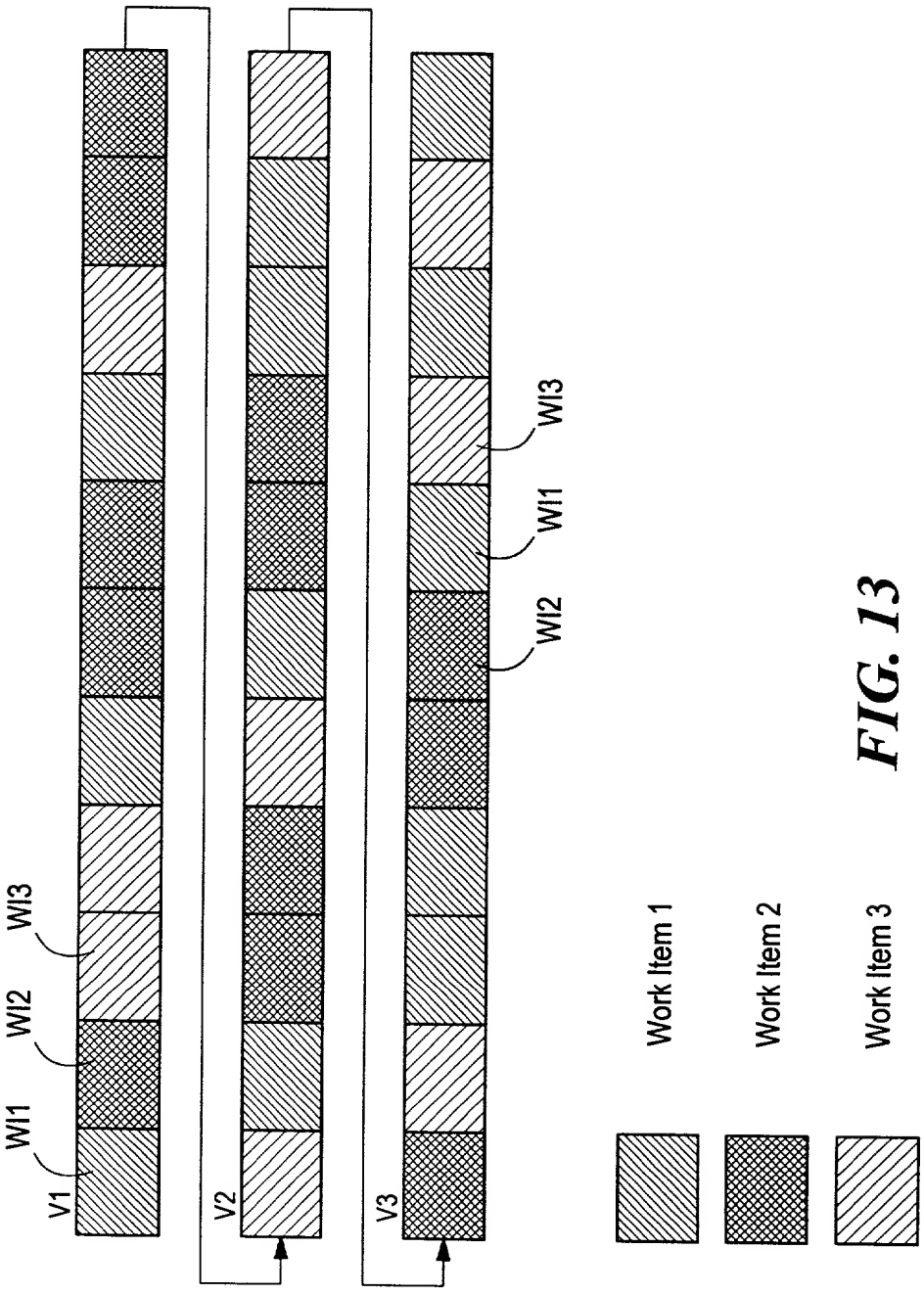

WI1
WI2
WI3
V1
V2
V3
WI3
WI1
WI2
Work Item 1
Work Item 2
Work Item 3

FIG. 13

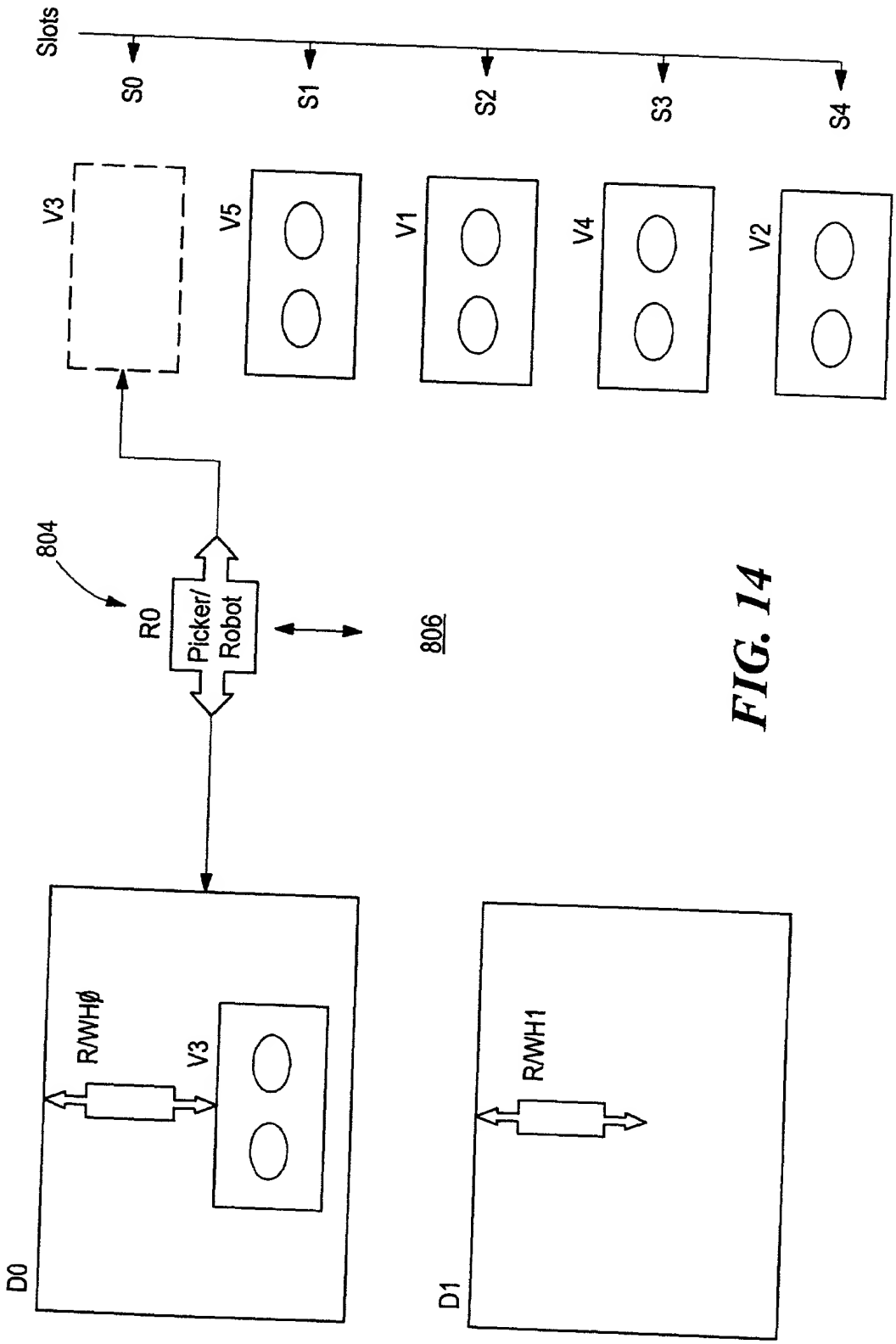

Slots
S0
S1
S2
S3
S4
V3
V5
V1
V4
V2
804
R0
Picker/
Robot
806
D0
R/WHØ
V3
D1
R/WH1

FIG. 14

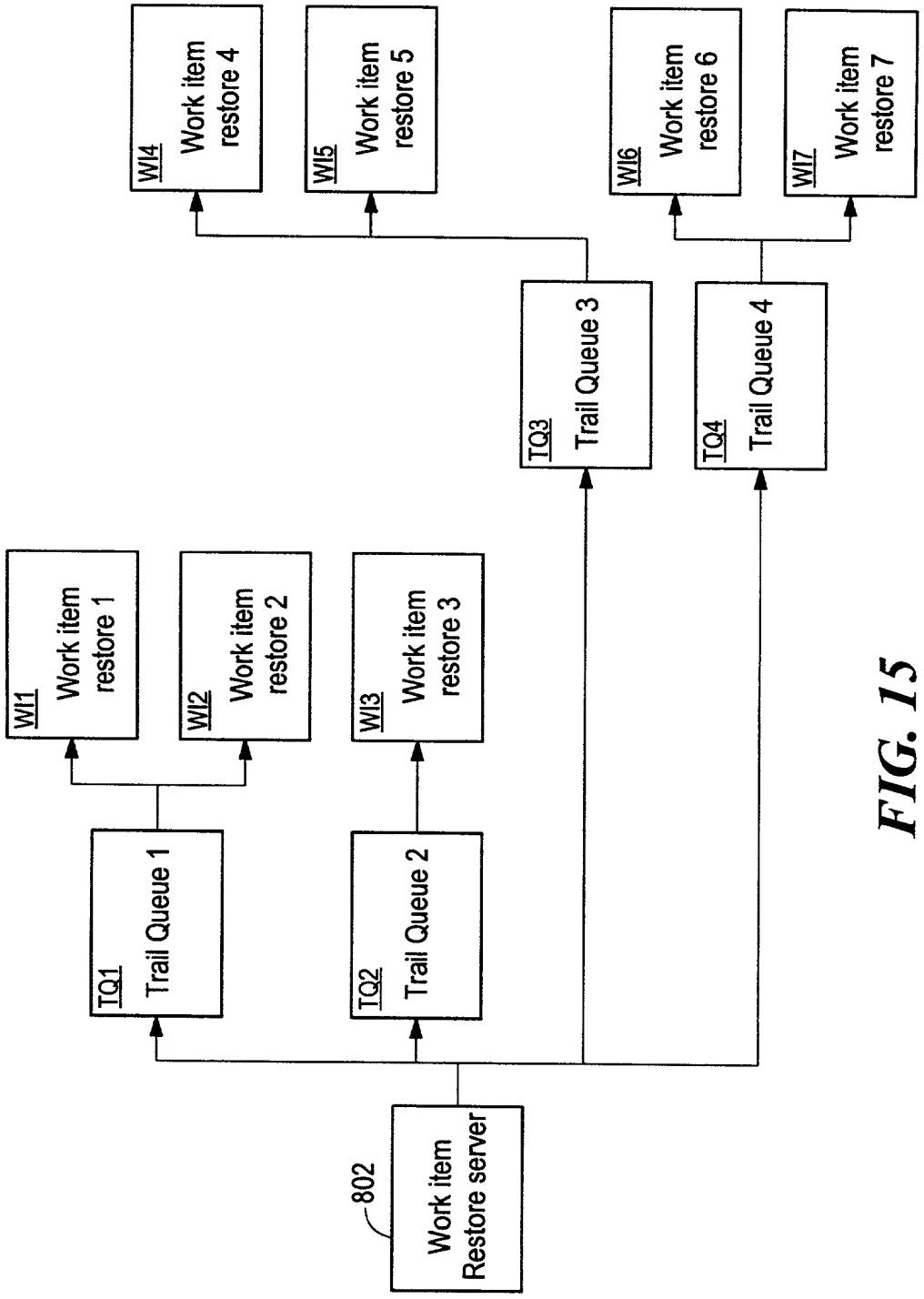

WI4
Work item restore 4
WI5
Work item restore 5
WI6
Work item restore 6
WI7
Work item restore 7
TQ3
Trail Queue 3
TQ4
Trail Queue 4
WI1
Work item restore 1
WI2
Work item restore 2
WI3
Work item restore 3
TQ1
Trail Queue 1
TQ2
Trail Queue 2
802
Work item Restore server

FIG. 15

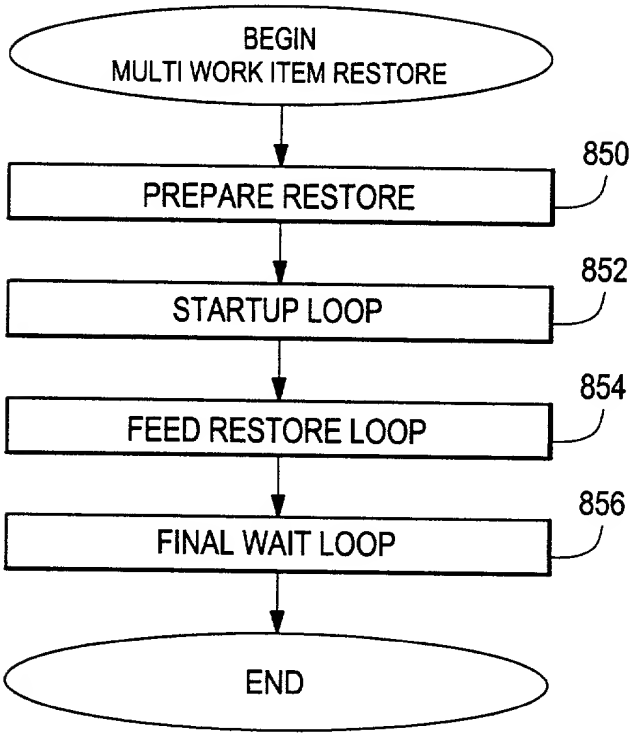

BEGIN
MULTI WORK ITEM RESTORE
PREPARE RESTORE
850
STARTUP LOOP
852
FEED RESTORE LOOP
854
FINAL WAIT LOOP
856
END

FIG. 16

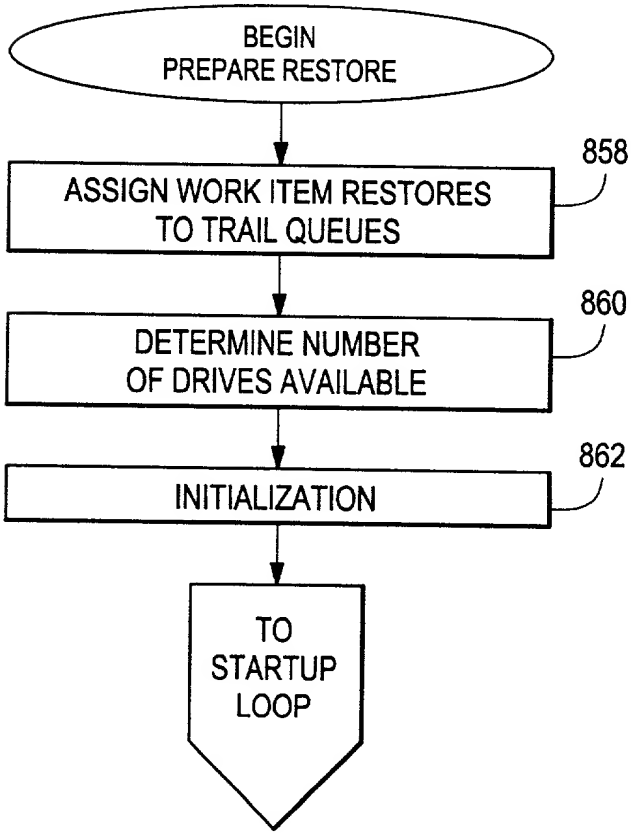

BEGIN
PREPARE RESTORE
ASSIGN WORK ITEM RESTORES
TO TRAIL QUEUES
858
DETERMINE NUMBER
OF DRIVES AVAILABLE
860
INITIALIZATION
862
TO
STARTUP
LOOP

FIG. 17

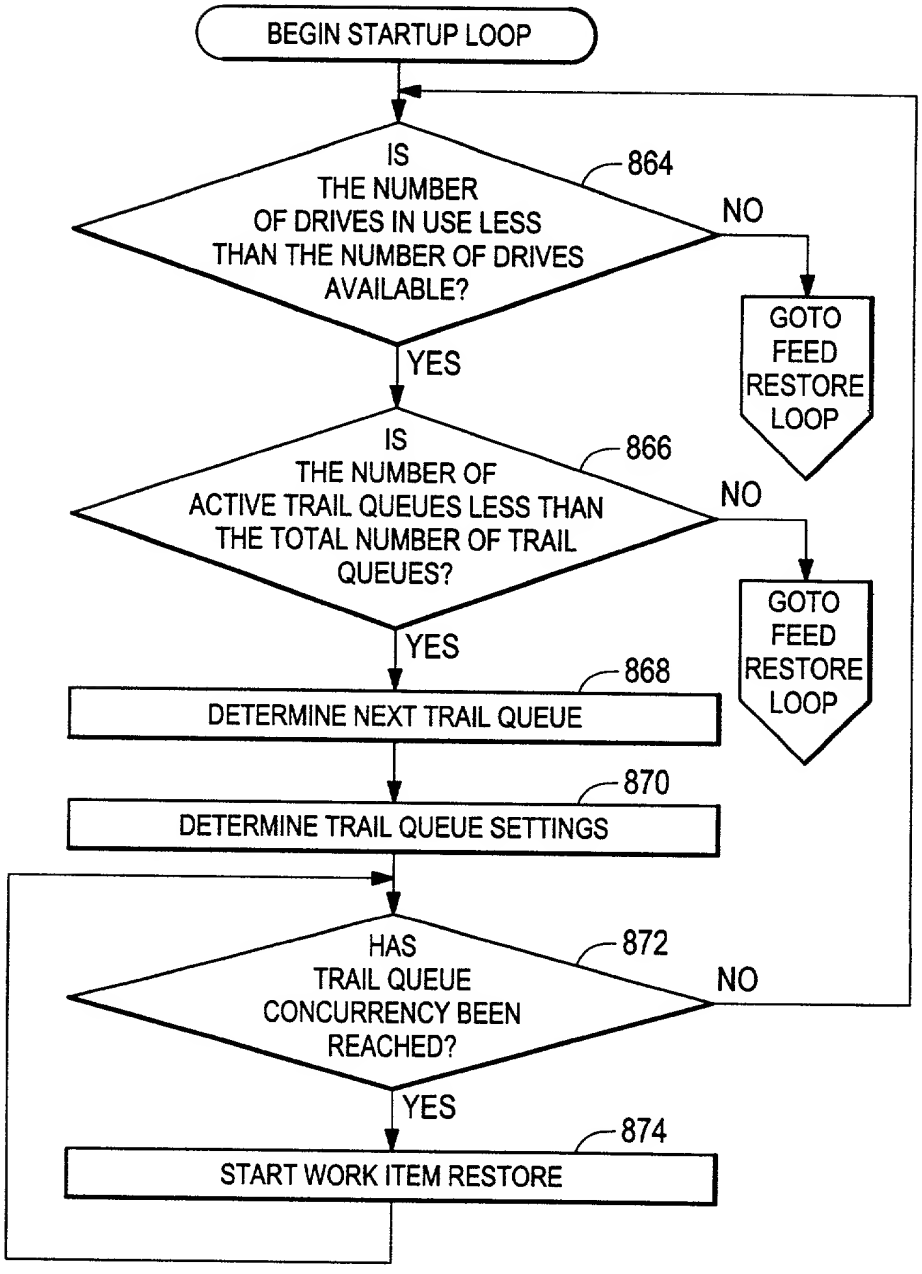

BEGIN STARTUP LOOP
IS THE NUMBER OF DRIVES IN USE LESS THAN THE NUMBER OF DRIVES AVAILABLE?
864
NO
GOTO FEED RESTORE LOOP
YES
IS THE NUMBER OF ACTIVE TRAIL QUEUES LESS THAN THE TOTAL NUMBER OF TRAIL QUEUES?
866
NO
GOTO FEED RESTORE LOOP
YES
868
DETERMINE NEXT TRAIL QUEUE
870
DETERMINE TRAIL QUEUE SETTINGS
HAS TRAIL QUEUE CONCURRENCY BEEN REACHED?
872
NO
YES
874
START WORK ITEM RESTORE

FIG. 18

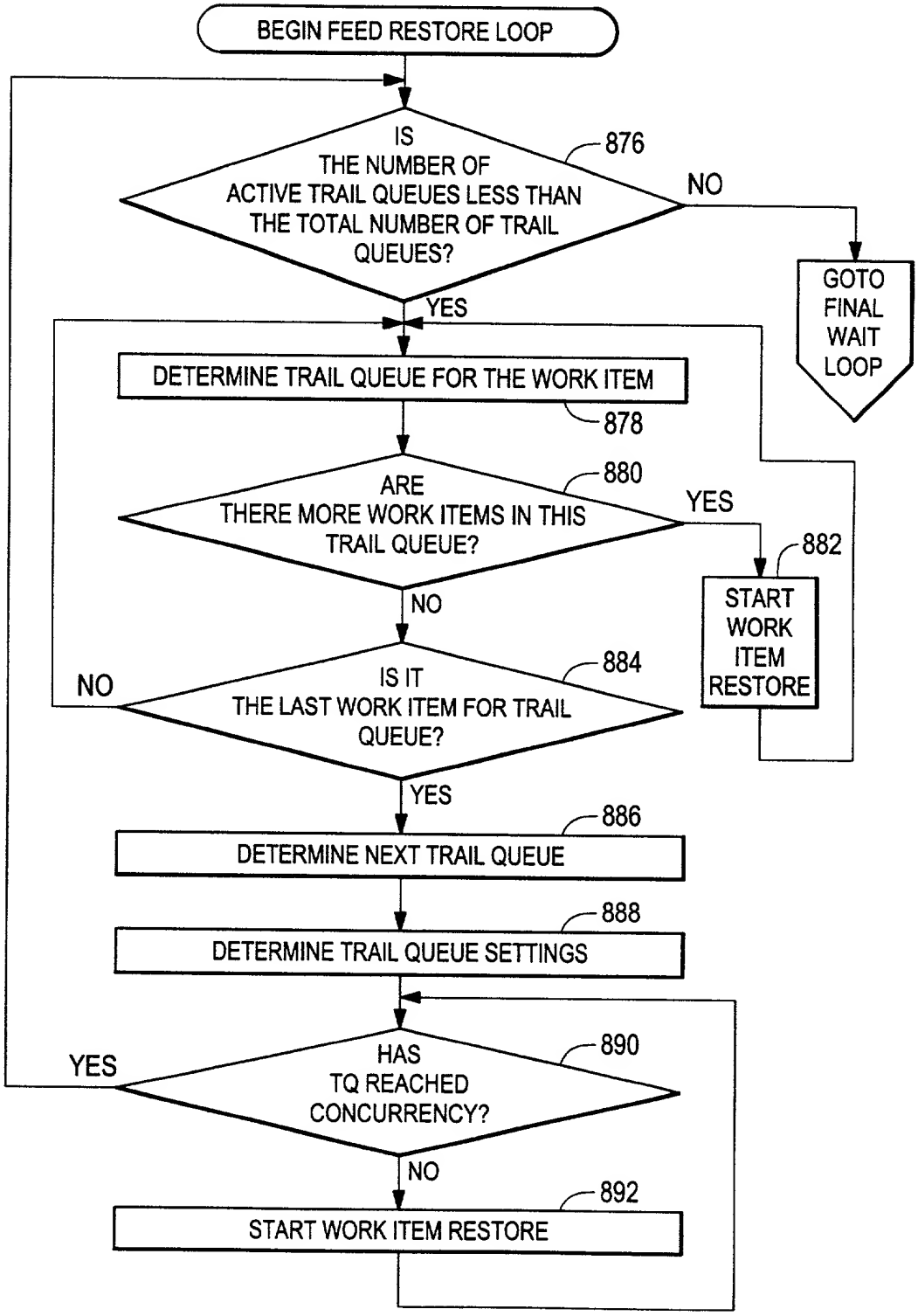

BEGIN FEED RESTORE LOOP
IS THE NUMBER OF ACTIVE TRAIL QUEUES LESS THAN THE TOTAL NUMBER OF TRAIL QUEUES?
876
NO
GOTO FINAL WAIT LOOP
YES
DETERMINE TRAIL QUEUE FOR THE WORK ITEM
878
ARE THERE MORE WORK ITEMS IN THIS TRAIL QUEUE?
880
YES
882
START WORK ITEM RESTORE
NO
IS IT THE LAST WORK ITEM FOR TRAIL QUEUE?
884
NO
YES
DETERMINE NEXT TRAIL QUEUE
886
DETERMINE TRAIL QUEUE SETTINGS
888
HAS TQ REACHED CONCURRENCY?
890
YES
NO
START WORK ITEM RESTORE
892

FIG. 19

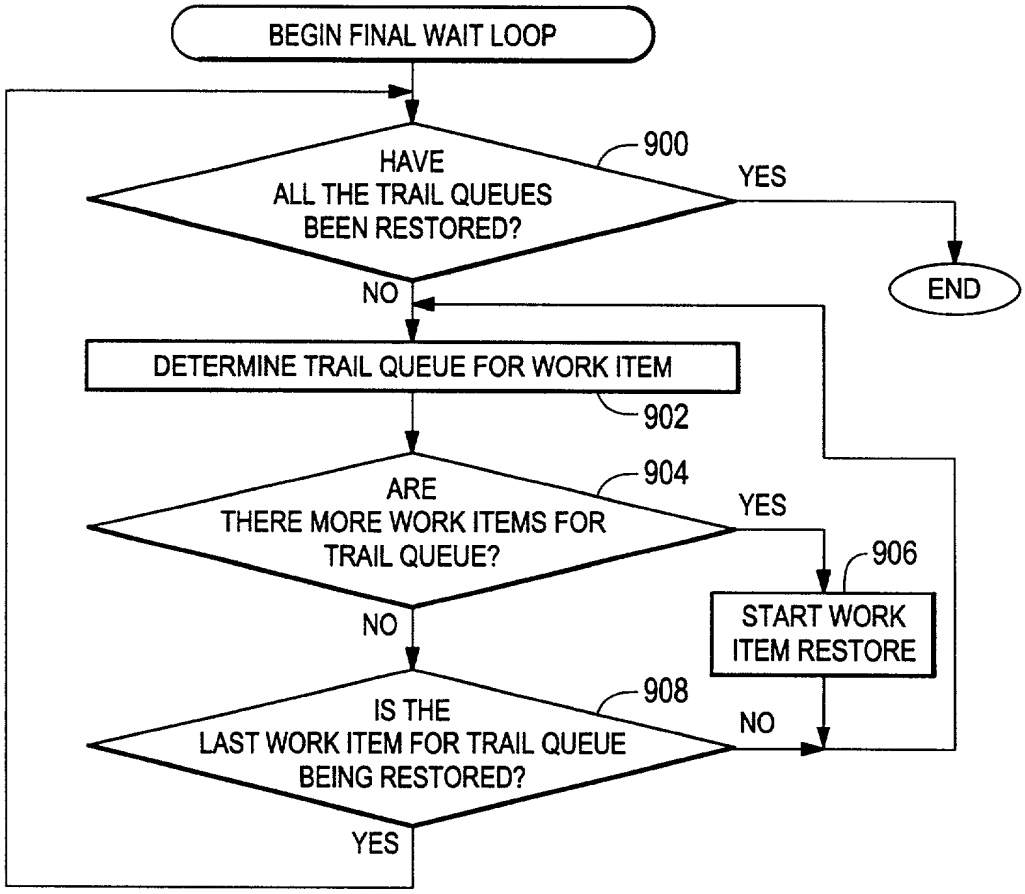

BEGIN FINAL WAIT LOOP
HAVE ALL THE TRAIL QUEUES BEEN RESTORED?
900
YES
END
NO
DETERMINE TRAIL QUEUE FOR WORK ITEM
902
ARE THERE MORE WORK ITEMS FOR TRAIL QUEUE?
904
YES
906
START WORK ITEM RESTORE
NO
IS THE LAST WORK ITEM FOR TRAIL QUEUE BEING RESTORED?
908
NO
YES

FIG. 20